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EXAMINER

SELLERS, DANIEL R

ART UNIT PAPER NUMBER

2644

DATE MAILED: 03/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                   |                    |  |
|------------------------------|-------------------|--------------------|--|
| <b>Office Action Summary</b> | Application No.   | Applicant(s)       |  |
|                              | 09/935,349        | WEARE, CHRISTOPHER |  |
|                              | Examiner          | Art Unit           |  |
|                              | Daniel R. Sellers | 2644               |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 9 December 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-13, 15 and 17-35 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13, 15 and 17-35 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 August 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments filed December 9, 2005 have been fully considered but they are not persuasive.
2. Regarding claim 17, the 112 2<sup>nd</sup> rejection is withdrawn, however a new rejection under 35 USC 103 is presented with respect to the well understood term.
3. Regarding claims 1-13, 15, and 18-20, in response to applicant's argument that "no case is made... suggest[ing] the step of 'inputting first, second, and third output data....'", the combination clearly teaches that "These complete trajectories are computed during the analysis but generally are not stored in the database. However, for each of these trajectories, the trajectory's mean and standard deviation are computed and stored (Blum, Col. 6, lines 33-36)." Blum teaches that it is favorable to store the average, or mean. The combination teaches that entropy is favorable in classifying information, wherein the combination would clearly store the mean and standard deviation of the entropy calculation.
4. Regarding claims 21-25, 27 and 29, see the following rejections under 35 USC 102. Blum teaches that a user trains the system by first placing the audio into classes (Col. 3, lines 30-34 and Col. 21, lines 55-58 and line 64 – Col. 22, line 3). The classes are taught to be in different databases and any audio files subsequently classified using the DSP techniques as taught will contain user classification data. The inclusion of the processed audio into a user-created database creates an equivalent structure.

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5. Regarding claims 30-33, Gjerdinen teaches both non-DSP and DSP techniques and the combination is made using knowledge generally available to one of ordinary skill in the art. The idea that digital signal processing is not 100% accurate and that human intervention and guidance can create better classification is generally available knowledge.

6. Regarding claim 34, see the following rejection under 35 USC 103.

***Claim Rejections - 35 USC § 102***

7. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

8. Claims 21-25, 27, and 29 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Blum et al., U.S. Patent 5,918,223 (hereinafter Blum).

9. Regarding claim 21, see Blum

*A method of classifying data according to spectral properties of the data, comprising:*  
*assigning at least one spectral properties class to each media entity of a plurality of media entities in a data set wherein said assigning is not based on digital signal processing; (Col. 21, lines 55-58, line 64 – Col. 22, line 3 and Col. 22, lines 31-33)*  
*processing each media entity of said data set to extract at least one spectral properties characteristic based on digital signal processing of each media entity; (Col. 22, lines 45-48)*  
*generating a plurality of spectral properties vectors for said plurality of media entities, wherein each spectral properties vector includes said at least one spectral properties class and at least one spectral properties characteristic based on digital signal processing; and (Col. 22, lines 48-50)*  
*forming a classification chain based upon said plurality of feature vectors. (Col. 22, lines 55-65)*

Blum teaches a method equivalent of classifying data according to its spectral properties and class with these features.

10. Regarding claim 22, the further limitation of claim 21, see

*... further comprising:*

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*processing an unclassified media entity to extract at least one spectral properties characteristic based on digital signal processing of the unclassified media entity; (Col. 21, lines 55-58)  
generating a vector for the unclassified media entity including said at least one digital signal processing spectral properties characteristic; (Col. 21, lines 58-60)  
presenting the vector for the unclassified media entity to the classification chain; and  
classifying the unclassified entry with an estimate of the spectral properties class by calculating the representative spectral properties class of the subset of the plurality of vectors of the classification chain located in the neighborhood of the vector for the unclassified entity. (Col. 21, line 66 – Col. 22, line 3)*

Blum teaches these features in a method of classifying data.

11. Regarding claim 23, the further limitation of claim 22, see Blum

*... further including calculating a neighborhood distance that defines a distance within which two vectors in the classification chain space are in the same neighborhood for purposes of being in the same spectral properties class. (Col. 22, lines 3-20)*

Blum teaches a calculation of a neighborhood distance.

12. Regarding claim 24, the further limitation of claim 22, see the preceding argument with respect to claim 23. Blum teaches classifying the entries according to statistical properties of the spectral properties of an entry, such as standard deviations or range values (Col. 21, lines 61-63). It is inherent to use the median to describe skewed sample ranges (Col. 22, lines 21-26).

13. Regarding claim 25, the further limitation of claim 22, see the preceding argument with respect to claim 23. Blum teaches a method of describing an unclassified entry according to a numerical value with these features.

14. Regarding claim 27, the further limitation of claim 21, see Blum

*A computer readable medium bearing computer executable instructions for carrying out the method of claim 21. (Col. 5, lines 41-49)*

Blum teaches a computer readable medium bearing instructions for a method with the features of claim 21.

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15. Regarding claim 29, the further limitation of claim 21, see the preceding argument with respect to claim 27. Blum teaches at least one computing device for performing the method.

***Claim Rejections - 35 USC § 103***

16. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

17. Claims 1-13, 15, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Blum and Kjaer, U.S. Pat. No. 4,603,386.

18. Regarding claim 1, see Blum

*A method for automatically classifying spectral properties of audio data, comprising:*

*applying input audio data (1) to a critical band filtering process to form first output data and (2) to an entropy calculation process to form second output data; (Col. 6, lines 24-28)*

*applying the first output data to a first derivative process to form third output data; (Col. 6, lines 28-30) and*

*inputting said first, second and third output data to an averaging process to form a spectral feature vector representing the input audio data. (Col. 6, lines 32-35 and lines 45-48)*

Blum teaches a method for automatically classifying spectral properties of audio data, wherein a feature vector is created with the above features. The critical band filtering process, as taught by Blum, is a Mel-frequency cepstral coefficient process. Blum does not teach the entropy calculation for use in a feature vector, however Blum has described a feature vector with a plurality of metrics. Kjaer teaches an entropy calculation, wherein a musical tone is classified by notes and accidentals (see Abstract and Col. 4, line 55 – Col. 7, line 34). Kjaer teaches that entropy is useful in classifying information composed of random processes, or processes that can be better understood using probability theory. It would have been obvious for one of ordinary skill

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in the art at the time of the invention to combine the teachings of Blum and Kjaer for the purpose of better classification.

19. Regarding claim 2, the further limitation of claim 1, see Blum

*... wherein the audio data is divided into frames, and the method is performed frame by frame. (Col. 6, lines 56-58)*

In the combination, Blum teaches the division of audio data into frames, wherein the method is performed frame by frame.

20. Regarding claim 3, the further limitation of claim 1, see

*... further including calculating root mean squared values of the input audio data. (Col. 8, lines 1-3)*

In the combination, Blum teaches RMS values.

21. Regarding claim 4, the further limitation of claim 2, see Kjaer

*... wherein said entropy calculation process includes calculating:*

$$S = - \sum_w p_w \log_2(p_w)$$

*where S is the entropy of the frame,  $p_w$  is the normalized magnitude of a bin w of the audio data, and  $\log_2(p_w)$  is the log base 2 of ( $p_w$ ). (Col. 5, lines 5-12 and equation H(x))*

Kjaer teaches this entropy measure.

22. Regarding claim 5, the further limitation of claim 2, see the preceding argument with respect to claim 3. Blum teaches the square root of the sum of squares, where the square root is a mapping function and adjusts the scale of the function.

23. Regarding claim 6, the further limitation of claim 2, see the preceding argument with respect to claim 1. The combination teaches this feature.

24. Regarding claim 7, the further limitation of claim 1, see the preceding argument with respect to claim 1. The combination teaches a frequency domain transform.

25. Regarding claim 8, the further limitation of claim 7, see Blum

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*... wherein said converting of the input audio data signal from the time domain to the frequency domain includes performing a fast fourier transform on the audio data. (Col. 7, lines 56-61)*

In the combination, Blum teaches an FFT.

26. Regarding claim 9, the further limitation of claim 2, see the preceding argument with respect to claim 1. The combination teaches dividing the input signal into frames and averaging the features over all the frames.

27. Regarding claim 10, the further limitation of claim 1, see the preceding argument with respect to claim 1. The combination teaches a classification process using the feature vector, and this classification process determines a property class that describes the audio data (Col. 6, lines 7-10).

28. Regarding claim 11, the further limitation of claim 1, see the preceding argument with respect to claim 1. In the combination, Blum teaches a feature vector, and Blum teaches that a vector is a row vector and not an NxM array (Col. 5, lines 52-55). Blum teaches a 1xN array, wherein it is inherent that N can be 25.

29. Regarding claim 12, the further limitation of claim 1, see Blum

*... wherein the audio data is formatted according to pulse code modulated format. (Col. 5, lines 24-50 and lines 64-66)*

In the combination, Blum teaches a plurality of input devices in the system, wherein it is well known that optical disks containing audio data are encoded in a PCM format.

Inherently Blum teaches this feature.

30. Regarding claim 13, the further limitation of claim 12, see the preceding argument with respect to claim 12. In the combination, Blum teaches the use of a microphone and further teaches that a sound produced into the microphone can be



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searched (Col. 3, lines 52-55). It is inherent that the digitization step converts the analog waveform to a PCM format.

31. Regarding claim 15, the further limitation of claim 12, see the preceding argument with respect to claim 8. The combination teaches an FFT operation, which is performed on the audio data.

32. Regarding claim 18, the further limitation of claim 1, see Blum

*A computer readable medium bearing computer executable instructions for carrying out the method of claim 1.* (Col. 5, lines 42-49)

Blum teaches computer readable mediums with instructions for carrying out the method taught by the combination.

33. Regarding claim 19, the further limitation of claim 1, see the preceding argument with respect to claim 12. Blum teaches a communication adapter, where it is inherent that this adapter is a modem, which uses keying or modulation to transmit and receive data. It is also well known in the art that computer executable instructions can be transmitted in a network. It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of Blum and the well-known technique of transmitting computer executable instructions over a network for the purpose of storing data a centralized server. A centralized server has many advantages, wherein one advantage is that one copy of a program can be sent to a plurality of remote computers.

34. Regarding claim 20, the further limitation of claim 1, see the preceding argument with respect to claim 18. The combination teaches a computing device for performing the method.

35. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Blum.

36. Regarding claim 28, the further limitation of claim 21, see Blum

*A modulated data signal carrying computer executable instructions for performing the method of claim 21.*  
(Col. 5, lines 22-40).

37. Blum teaches a communication adapter, wherein it is inherent that modulated signals are transferred using communication adapters. It is well known that computer instructions can be transferred over a network using communication adapters. It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of Blum and the well-known technique of transmitting computer executable instructions over a network for the purpose of storing data a centralized server. A centralized server has many advantages, wherein one advantage is that one copy of a program can be sent to a plurality of remote computers.

38. Claims 17, 26 and 34-35 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Blum and Gjerdingen.

39. Regarding claim 17, the further limitation of claim 1, see Gjerdingen

*... further comprising performing a principal component analysis process on the spectral feature vector.*  
(Col. 15, lines 37-44)

Blum teaches a refining process on the feature vector, but does not teach principal component analysis (PCA). Gjerdingen teaches that PCA is used to reduce the complexity of the data being analyzed. It would have been obvious for one of ordinary

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skill in the art at the time of the invention to combine the teachings of Blum and Gjerdingen for the purpose of reducing the complexity of the analysis.

40. Regarding claim 26, the further limitation of claim 22, see the preceding argument with respect to claim 31. Blum teaches the features of the parent claims 21 and 22, but Blum does not teach a level of confidence measure. Gjerdingen teaches a measure indicating the level of confidence regarding classification.

41. Regarding claim 34, Gjerdingen teaches human classification of the audio data (Fig 5a), wherein each entry is assigned at least one value. Blum teaches that the construction phase reduces the results to a set of numbers called the characteristic vector, wherein the vector is stored for later use (Col. 3, lines 10-21 and lines 30-34). Blum also teaches a classification phase comprising presenting an unclassified sound and calculating the characteristic vector (Col. 6, lines 24-30), and presenting the vector to the classification chain which returns an estimate (Col. 6, lines 45-52).

42. Regarding claim 35, the further limitation of claim 34, see the preceding argument with respect to claims 1-5 and 34. The combination of Blum and Gjerdingen teach these features in a method of classifying data.

43. Claims 30-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gjerdingen.

44. Regarding claim 30, see Gjerdingen

*A computing system, comprising:*

*a computing device including:*

*a classification chain data structure stored thereon having a plurality of classification vectors, wherein each vector includes data representative of a spectral properties class as*

*classified by humans and spectral properties characteristics as determined by digital signal processing; and (Col. 3, lines 50-54 and Col. 9, lines 28-39)*

*processing means for comparing an unclassified media entity to the classification chain data structure to determine an estimate of the spectral properties class of the unclassified media entity. (Col. 6, line 66 – Col. 7, line 2)*

Gjerdingen teaches a computing system with these features to create a searchable database. In two different embodiments Gjerdingen teaches either human or machine classification (Fig. 4, items, 403 and 403B), however one skilled in the art of machine classification is aware that machines do not provide one hundred percent accuracy with regard to complex signals (i.e. music or speech). It would have been obvious for one of ordinary skill in the art at the time of the invention to combine the teachings of the two different embodiments in Gjerdingen for the purpose of more accurate classification.

45. Regarding claim 31, the further limitation of claim 30, see Gjerdingen

*... wherein said determining of an estimate of the spectral properties class includes returning at least one number indicating the level of confidence of the spectral properties class assignment. (Col. 10, lines 53-57)*

Gjerdingen teaches a level of confidence indicator.

46. Regarding claim 32, the further limitation of claim 31, see the preceding argument with respect to claims 30 and 31. It is inherent that a system using the method taught by Gjerdingen will undergo an improvement in classification with experts review and more data samples (Col. 8, lines 19-24).

47. Regarding claim 33, see the preceding argument with respect to claim 30.

Gjerdingen teaches a system with human and DSP classification techniques regarding the spectral properties of media entities.

***Conclusion***

48. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Farry et al., U.S. Pat. No. 6,272,479, Araki, U.S. Pat. No. 6,799,164, and Bolle et al., U.S. Pat. No. 6,892,193.

49. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel R. Sellers whose telephone number is 571-272-7528. The examiner can normally be reached on Monday to Friday, 9am to 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571)272-7564. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



**SINH TRAN**  
**SUPERVISORY PATENT EXAMINER**

DRS